

3. A method of claim [1] 17, additionally comprising exposing the sample population to a physiological challenge prior to acquiring the test data.
4. (Amended) A method of claim [3] 17, additionally comprising acquiring control data relating to the one or more geometrical properties of the sample population prior to exposing the sample population to [a physiological challenge] a candidate optical contrast enhancing agent.
5. (Amended) A method of claim 4, additionally comprising comparing the test data to the control data to assess changes in the one or more [geometrical or optical] properties of the sample population representing [changes in the physiological state of the sample population] activity of the candidate optical contrast enhancing agent.
6. (Amended) A method of claim [1] 17, wherein the comparison data is derived from empirically determined controls.
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7. (Amended) A method of claim [1] 17, additionally comprising maintaining multiple sample populations in an *in vitro* culture system.
9. (Amended) A method of claim [1] 17, wherein the test data acquired relates to one or more optical properties selected from the group consisting of: reflection, refraction, diffraction, absorption, scattering, birefringence, refractive index and Kerr effect.
10. (Amended) A method according to claim [1] 17, wherein the biological material is a viable sample population maintained in a cell culture system.
11. (Amended) A method according to claim [1] 17, wherein the biological material is a viable, intact organism.